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SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
08/462,742	06/05/95	ZHANG	H 0756-1299

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D1M1/1010

RADOMSKY EXAMINER	
ART UNIT	PAPER NUMBER
1104	

DATE MAILED:

10/10/96

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents

Office Action Summary	Application No. 08/462,742	Applicant(s) Zhang et al.
	Examiner Leon Radomsky	Group Art Unit 1104

☒ Responsive to communication(s) filed on Jul 29, 1996

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 3-12 and 14-26 is/are pending in the application.

☐ Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 3-12 and 14-26 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 3-8,11-12,14-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka (JP '915) in view of Liu et al. (US '826), as of record.
3. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka in view of Liu et al. as applied to claims 3-8,11-12,14-25 above, and further in view of Yonehara (US '093) or Shibata (US '224 or JP '224), as of record.
4. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oka in view of Liu et al. as applied to claims 3-8,11-12,14-25 above, and further in view of Kuznetsov et al. (Microsc. Semicond. Mater. Conf. '93). Oka and Liu do not teach SIMS testing of the metal concentration.

Kuznetsov teaches determining Ni concentration in metal induced crystallized silicon using SIMS (Section 2).

Therefore, it would have been obvious to one of ordinary skill in the art to test the metal induced crystallized silicon of Oka by SIMS to check for the presence of and to determine the distribution of deleterious metal impurities (Oka, Pages 10-11 of translation) as taught by Kuznetsov.

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Response to Arguments

5. Applicant's arguments filed 4-26-96 have been fully considered but they are not persuasive.

Applicants argue that Oka does not disclose a crystal growth direction parallel to the surface of the substrate. However, Oka does teach that grains nucleate in the seed region (204,403) (Fig. 2b,4) and subsequently grain growth proceeds parallel to the substrate through the connecting region (402) (Fig. 4) to the active island region (205, 404) (Fig. 2c,4).

Applicants argue that even if Oka teaches a crystal growth direction parallel to the surface of the substrate, Liu teaches grain growth perpendicular to the substrate, and therefore, Oka and Liu are incompatible. Examiner agrees that Liu teaches perpendicular grain growth in regions only where the metal catalyst is formed. However, examiner disagrees that Oka and Liu are incompatible. Oka teaches that at first small grains grow perpendicular to the substrate directly under the metal region (203) after a first anneal (Page 10 of translation), then the metal (203) is removed and the grain growth proceeds parallel to the substrate during a second anneal (Page 11). Thus, Oka and Liu are not incompatible because Oka's method includes both the method of Liu (perpendicular grain growth) and the parallel grain growth. Therefore, one of ordinary skill in the art would recognize that both perpendicular and parallel metal enhanced grain growth occurs from the teaching of Oka, and such a person would be motivated to use metal enhanced grain growth to form polysilicon driver TFTs in the recrystallized areas and amorphous pixel TFTs in the uncrystallized areas, as taught by Liu. Also, one of ordinary skill in the art would be

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motivated to form the polysilicon driver TFTs of Liu in the parallel grain growth areas rather than in the perpendicular growth areas because the parallel growth areas contain a smaller amount of deleterious metal impurity than perpendicular growth areas, as taught by Oka, Pages 10-11 and because the parallel growth areas contain superior quality grains compared to perpendicular growth areas, which may contain multiple crystal nuclei (i.e. small grains and large numbers of grain boundaries) as taught by Oka, bottom of Page 11.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

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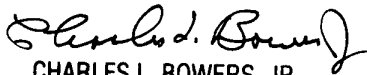
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This office action has been created under the Patent and Trademark Office Semiconductor Technology Quality Assurance Pilot Program. It incorporates the examination quality standards set as a result of customer focus sessions with the semiconductor industry. The listing of the field of search to follow is one of these standards.

Field of Search	Date
U.S. Class and subclass: 437/21,40TFT,41TFT,88,99,101,109,174,233 148/Dig. 16,150.	10/95 & 10/96
Other Documentation:	
Electronic data base(s): USPAT JPOABS INSPEC	9/95 & 10/95

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leon Radomsky** whose telephone number is (703) 305-3445.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661. Group 1100 fax number is (703) 305-3600.


CHARLES L. BOWERS, JR.
SUPERVISORY PATENT EXAMINER
GROUP 1100

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10/2/96